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Perspectives

Wealth-based Fisheries Management: Using Fisheries Wealth to Orchestrate Sound Fisheries Policy in Practice

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Abstract *The importance of resource rent in fisheries has long been acknowledged. By generating such rents, economically efficient management systems increase value added and the sector's contribution to the gross domestic product (GDP) and growth. However, despite the successful adoption of such systems in some countries around the world, economics continues to have relatively little influence on fisheries policy. This lack of influence is particularly noticeable in developing countries, precisely where the contribution that effectively managed fish resources might make to the GDP is most urgently needed. The key requirement to increase the adoption of economically rational fisheries management is to convince policymakers to focus explicitly on the wealth-generating potential of fish resources. Such a focus provides a general policy framework within which other approaches, such as rights-based, incentive-based, and ecosystem-based, may be nested. This approach is likely to prove more effective in influencing policy, especially in situations where rights-based systems either will not work or are politically unacceptable.*

Key words Wealth-based fisheries management, resource rent, fisheries policy, economic growth.

JEL Classification Codes Q22, Q28.

Introduction

"Sometimes the first duty of intelligent men is the restatement of the obvious." George Orwell

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This article argues the case for focusing explicitly on the inherent wealth of the fish resource in order to improve the practical performance of fisheries policy and management worldwide and especially in developing countries. It begins by briefly reviewing the current state of world fisheries. Notwithstanding some bright spots, the general situation is very poor. The following section suggests that this situation arises largely because of continued widespread ignorance by policymakers of the importance of resource rent.

The issue of rent has, of course, long been discussed both in general terms and specifically in fisheries since the pioneering studies of Gordon (1954) and Scott (1955)—and prior to that in the less well-known work of Warming (1911) (translated by Andersen [1983]). But the practical application of the concept in fisheries management remains very limited. In our experience, an important reason for this limited application is that concepts such as resource rent (and related ones such as economic efficiency and the zero rent outcome in free and open-access fisheries) are often considered too abstruse to influence policy. The challenge, following Orwell, is to restate what now seems obvious to most, if not all, fisheries economists in a way that will also become obvious to policymakers and fishers.

We are not the first to attempt to respond to this challenge. The article reviews the search for alternatives to strengthen fisheries policy. We argue, however, that these alternatives are subsets of what we term wealth-based fisheries management (WBFM), which we contend will result in a more generally understandable and policy-relevant approach.

The article discusses the potential payoff to such an approach and then looks at the practical requirements for its implementation. There is, however, no unique recipe for WBFM; its precise incarnation will depend on the particular circumstances of the fishery or country, although the broad principles will remain the same. WBFM is consistent with a range of policy goals; it is far less about setting such goals than how they may be achieved.

The article then considers the scope of WBFM, taking as a particular case the thorny problem of small-scale fisheries management and poverty reduction. This discussion highlights the generality of the economic analysis of the fisheries problem and the foundation that it provides for practical solutions. This is to be compared to the alternative, which continues to see small-scale fishing as qualitatively different to other kinds of fishing (that may have various epithets—coastal, industrial, large-scale, etc).

Assuming that policymakers can be convinced of the need to recast their fisheries policy into a wealth-based framework, a key question is how one might begin the transition from the current situation of overfishing and overcapacity.

The final section presents the main conclusions and recommendations of the article; namely that addressing the economic issues facing capture fisheries in terms of WBFM will help to increase the policy relevance of economics generally. The approach and its conclusions are likely to be of particular significance for fisheries policy formulation in developing countries, where fish resource wealth offers important unrealised potential to contribute to economic growth, poverty alleviation, and social welfare.

The State of World Fisheries

Assessing the state of world fisheries is a difficult exercise because the situation varies by country and fishery. Nonetheless, it seems clear that at a global level, fisheries are overexploited and make little, if any, net economic (fiscal) contribution.

This overexploitation of fish resources is always and everywhere of economic origin. Yet economic data remain sparse for most fisheries. For example, almost all of the world's fisheries have an overcapacity problem, but despite the United Nations Food and Agriculture Organisation (FAO) International Plan of Action for the Management of Fishing Capacity (IPOA-CAPACITY), capacity data are not easily available.

Economic data that are available tend to concentrate on the low contribution that the sector usually makes to the GDP. However, in the face of widespread overexploitation, the GDP contribution is a very misleading indicator. Perhaps the most robust result in fisheries economics is that under free and open-access conditions, exploitation levels will reach equilibrium only when all resource rent has been dissipated (see *e.g.*, Cunningham, Dunn, and Whitmarsh 1985). GDP calculations generally ignore the fact that if this resource wealth can be captured, the renewable contribution of fish resources to the GDP can be substantially increased.

The dissipation of resource rents (*i.e.*, the loss of a large part of potential fisheries wealth) is a necessary consequence of the failure to address the free and open-access issue effectively. One possible corollary of this economic overexploitation may be biological overexploitation (overfishing) of the fish stocks. But of course such overfishing, usually defined in terms of effort in excess of the maximum sustainable yield (MSY), will only occur if price and cost factors allow.

Data on overfishing are available, and it is clear that many of the world's fish stocks are currently in a dire state. In the latest edition of the SOFIA, around 28% of the world's fish resources in 2007 were categorised as "overexploited, depleted and recovering," 52% "fully exploited," and 20% "underexploited and moderately exploited" (UNFAO 2009, p. 30). It is instructive that in 1974 the corresponding percentages were 10%, 50%, and 40%. Although the FAO makes the point that much of the damage had been done by the mid-1990s and that the situation has been variable but reasonably stable since then, it is somewhat depressing to record that the situation reported in 2009 is actually worse than that reported in the 2007 edition of SOFIA where the percentages were 25%, 50%, and 25% (UNFAO 2009). Doubtless this change is not statistically significant, but what is clear is that the situation in 2007 was worse than that in 1974 and there is no sign of global improvement.

At a fiscal level, the defining characteristic of the fishing industry worldwide is one of subsidies and other government support. The pioneering work of the FAO estimated annual subsidies to be on the order of $54.5 billion (UNFAO 1993). Milazzo (1998) subsequently produced a much lower estimate of $14 to $20 billion. More recently still, a study edited by Sumaila and Pauly (2006) estimated that world fisheries are subsidised at between $30 and $34 billion per annum. Although estimates of subsidies may vary, the important point is that no study seems to exist that finds that the net fiscal contribution of the world fishing industry is positive.

Weak Policy

Whilst unmanaged (free and open-access) fisheries can be expected to be overexploited, this is clearly not the major problem facing world fisheries today. In fact, the majority of the world's fisheries have long been managed often using limited-access licensing schemes of various kinds. Moreover, ownership of many resources was clarified by the extension of fishing limits in the late 1970s and early 1980s.

The failure of fisheries policy leading to the poor outcomes summarised above arises, in our experience, from a widespread lack of understanding of the role of resource rent. This failure is doubly harmful. Not only has policy ignored the fact that it is such rents that drive overexploitation where management is ineffective, but policy has also failed to appreciate that the rents provide a measure of the potential contribution of fisheries to economic growth and welfare where management is effective. As a result, in many countries fisheries are seen simply as a problem sector making a low (and declining) percentage contribution to the GDP; whereas, if well managed, fish resources could be making an important renewable contribution to growth.

The failure to focus on what should be the key issue in fisheries policy has led policymakers in many countries to focus on symptoms of the problem. The most obvious

manifestation of this is the almost universal policy goal of resource conservation. Few policymakers seem to ask themselves why they have to adopt such a goal or why the fishers are so busy sawing off the branch on which they are sitting.

This focus on one of the consequences of fisheries overexploitation, as well as being doomed to failure, has some pernicious side effects, leading, for example, to the continued adoption of long-criticised biologically based harvest targets (particularly MSY), which make no economic sense. Moreover, the failure to adopt effective fisheries management systems coupled with the goal of resource conservation is leading to the increasing adoption of "blunt" fishing instruments such as marine protected areas (MPAs), bans, and consumer boycotts. Whatever merits such measures may have, it is clear that not only are they unable to resolve the overexploitation problem, but they also increase the vulnerability of fishers.

Ironically, this conservation objective often goes hand-in-hand with a strong policy emphasis on the physical weight of fish caught. Moreover, the benefits from fish resource exploitation are typically perceived in terms of the fishing activity itself, especially employment. In order to benefit from fish resources, it is necessary to be a fisher (or part of a fisher household). Yet, paradoxically, there also tends to be an emphasis on adopting modern fishing technology, which inevitably conflicts with employment objectives. And fisheries policies also tend to specify goals of increasing value added. In the absence of effective management systems, both revenue enhancement (for instance, through increased value addition at the product level or reduced post-harvest losses) and cost reduction (for instance, through improved technology or modernised fleets) simply lead to increased exploitation levels, worsening the overexploitation that characterises global fisheries.

Finally, although the situation is gradually changing in a few countries that are considered to be in the forefront of fisheries management (see Cunningham and Bostock (2005) for some empirical examples, which include some developing countries), fishers, and poor fishers in particular, generally have very poorly defined use rights and are therefore extremely vulnerable to events in other economic sectors (agriculture, tourism, urbanisation, and so on).

The absence of a coordinating central theme in the typical fishery policy model results in a set of conflicting objectives. In many, perhaps most, countries, the defining characteristic of fisheries policy is discord. Policy objectives are often ill directed and apparently sensible policy choices have unintended, or perverse, effects that many policymakers find difficult to understand.

Without doubt, the most perverse result is that both fishers and policymakers treat the fish resource fallaciously as if it were a free good, inviting destructive rent-seeking behaviour. This factor may also explain certain policy choices; for instance, where the resource is seen as free, then why not use it to provide a short-term source of foreign exchange by selling access rights, even if this may result in fishing beyond environmentally sustainable levels?

In this sea of policy confusion and discord, a focus on WBFM provides a practical way of introducing some logic into the policy process. The key issue is to establish a widespread understanding of the economic factors leading to overexploitation, and of the true wealth of (well-managed) fisheries, and thence to develop robust arrangements to capture, preserve, and fairly allocate this wealth.

In this way, a key contribution of WBFM to policy is to highlight the fact that the central problem facing fisheries management is one of political economy and not of fish stock assessment. To paraphrase the Orwell quotation, this may seem like stating the obvious to economists, but getting this message into the policy process in an effective way is an immense challenge in practice.

Following Hardin (1968), fisheries are often seen as an example of the "tragedy of the commons." The true tragedy of fishing, however, is that the vast inherent resource wealth has served to deplete, and in some cases destroy, the very resources that generate

it and continues to do so. Resource wealth can be heaven or hell, depending on the fishery management arrangements in place.

The Search for Alternatives

Faced with the widespread failure of what might be referred to as conventional fishery management systems either to deliver sustainable economic benefits or conserve the resource base, alternative approaches are urgently needed.

There is much to be said for the approach that argues that successful management requires the incentives of fishers to be aligned with those of managers (see *e.g.*, Hilborn, Orensanz, and Parma 2005). However, an important difficulty is that managers themselves may not have the most appropriate objectives to guide fisheries management. For example, in line with the policies outlined above, a key indicator of success has often been the quantity of fish produced, and in many ministries around the world attempting to increase this quantity remains an important goal.[1] Given the limited natural productivity of fish resources, this objective is misplaced and has contributed significantly to fisheries overexploitation. There is an urgent need to ensure that appropriate management objectives are established, especially if the aim is to align fishing industry incentives to these. The problem is to decide what these objectives should be and how they may be achieved.

The approach that currently appears to be gathering the strongest momentum is rights-based fisheries management (UNFAO 2000). Whilst it is true that many of the fisheries identified as successful have adopted rights-based approaches, the issue is nonetheless more complicated. Use rights provide a means to capitalise resource rents into the price of the right. This is an important starting point, but it will lead to a sustainably successful outcome only if the rents generated do not adversely affect fish exploitation behaviour. This is far from the case with all rights systems and is probably completely the case with none of them.

Most current rights-based systems provide only a partial solution to stopping the destruction of wealth in fisheries, and such arrangements continue to evolve. The rights need to be properly specified and supported by appropriate fiscal, legal, and other institutions that legitimise and protect their operation. Effort-based fishing licences, for instance, are clearly a form of rights, yet are notoriously poor at producing sustainable wealth gains because of the problem of input substitution (*e.g.*, Pascoe and Robinson 1998). Licenses only cover some dimensions of fishing effort, and as rents emerge fishers can be expected to seek to increase their effort by substituting unrestricted inputs for restricted ones. If the degree of substitutability between inputs is very low, then licences may be more effective. However, even here, rents are likely to be eroded, as there will tend to be excessive innovation expenditure as fishers seek to find ways to increase input substitutability.

We believe the key to success lies neither in the incentives nor in the rights themselves but in their ability to address the issue of resource wealth. In the case of use rights, the correct policy question is not how best to introduce these; rather it is how institutions upholding rights can best be developed and implemented to assist in moving towards wealth-based management.

In fact even this latter question may be too narrow. Wilen (2005) argues that Gordon's (1954) classic paper was crucial because it identified the key role played by resource rent, but it set fisheries economists off down the wrong track by using a "lump-of-effort" approach. As a result, it appeared that vessel licensing would solve the problem, which it clearly failed to do when tried in the 1960s because of the multi-dimensional nature of fishing effort.

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[1] We use the term "ministry" throughout the article to designate the fishery management authority as shorthand to cover the range of political and administrative arrangements that may exist in practice.

There is another feature of Gordon's paper that has also been very influential in the way that policy has subsequently developed, which is the emphasis on open access as the key issue. But fisheries overexploitation is driven by resource rents under conditions of *open* and *free* access. Although solutions may be found through addressing the *open*-access dimension, they may also be found through addressing the *free*-access dimension. The focus on open access has spawned a huge literature in fisheries economics on rights, whereas the free access element has been dealt with to an insignificant degree in comparison. Yet in situations where introducing rights may be politically or institutionally infeasible, dealing with free access may at least provide a partial solution, even if it may not be perfect. Moreover, equity issues may dictate that the open and free aspects be treated together.

We would suggest, therefore, that a more appropriate and generic policy question to be addressed by fishery managers is *how best to ensure that the resource wealth inherent in fisheries is put to productive use rather than driving overexploitation.*

Wealth-based Fisheries Management

From a practical perspective, we suggest that WBFM is the best way to approach the problems currently afflicting the world's fisheries. It would include both incentive-based and rights-based management as subsets that may contain some or all of the answer in some places and at some times.

The key aim of WBFM is to ensure that the inherent wealth of fish stocks contributes to increasing social welfare. A key requirement is for policymakers to understand that although they may chose to avoid addressing resource rents in their policies, they are not able to avoid their effects. If not dealt with effectively, resource rents will simply continue to drive fisheries overexploitation and undermine policy outcomes. Again, however obvious this point may seem to economists, policymakers often struggle to grasp its significance.

An important feature of WBFM is to emphasise the need for governments to understand the macroeconomic contribution that the fishery sector is capable of making. This is a daunting challenge, particularly when starting from a position of overexploited fish resources. Indeed, the sector is often seen as making a marginal contribution to key macroeconomic aggregates, a perspective which is hardly surprising when its largest potential contribution to the GDP, resource rent, is dissipated. The key decision variable is what the potential contribution of the sector would be if it were well managed, but information of this type is rarely available. As a result, fishery sector development is often assigned a minor role, if any, in Poverty Reduction Strategy Papers (PRSPs) or similar development policy instruments. Yet, effectively managed, the sector is capable of producing reinvestable rents on a perennial basis. The size of this contribution will vary according to the value of national fish resources relative to the economy as a whole, but there is always a level at which it is possible to make a difference, be it national, regional, or local.

In our experience, developing an understanding of this macroeconomic potential of the sector requires a substantial investment of time and resources, working with the highest instances of government, from presidential or prime ministers' offices, through ministries of finance, and planning, to the central bank, and other agencies as appropriate. The most important result is to develop a set of success indicators for the line ministry that are more economically coherent than those that have emerged from the conventional policy approach (as reviewed above).

Once accepted, the successful implementation of WBFM requires the design of appropriate institutional frameworks. Governance requirements may be substantial and include consideration of the policy framework; the legal regime; fiscal measures; the organisational arrangements (including the nature and structure of the management bodies and the line ministry); the nature of management mechanisms and instruments; success

indicators; the nature of research support; the organisation of communication principles and processes between the administration, research, and the profession; the design of fish information systems; and so on.

In moving from current systems to WBFM, meaningful fishery management units (FMUs) must be established to allow the design and implementation of an effective policy framework, with an emphasis on the generation of sustainable resource rents. The aim of this approach is to increase governance and stakeholder capacity, with government playing the enabling (oversight) role for sustainable private sector expansion.

But there is, of course, no unique recipe for success. Systems cannot simply be transferred from one country to another, or even from one fishery to another within the same country, although the experience and lessons learned can certainly provide valuable lessons. WBFM is flexible and can be tailored to the specific conditions and objectives of different countries and fisheries.

For instance, an important difference between developed and developing states is that in the former, by and large, wealth created in the private sector will be reinvested into the national economy; whereas in the latter, wealth may find itself being lost through over-concentration and by saving in offshore banks. The gap between private and social benefits (and costs) may therefore be much greater in developing states, and it will be much more important to include distributional issues in the design of WBFM systems under these conditions.

The problem of winners and losers following social and economic change has long been recognised in social welfare economics. Linking WBFM with approaches such as sustainable livelihoods may be of particular relevance in this regard, since it may help to ensure that the approach takes account of the realities at the micro-level, rather than focussing only on the macro-level.

In summary, in the search for effective fisheries management, many essential threads already exist. These include the notions of good governance, pro-poor growth, sustainable livelihoods, and ecological sustainability—many of which are included, for example, in the newly emergent Ecosystem Based Approach (EBA) to fisheries management (*e.g.*, Joint Nature Conservation Committee (2008). However, it is WBFM, and not approaches such as the EBA (or rights or incentives) *per se*, that provides a coherent framework within which they may be developed effectively, contributing towards the long process of moving global fisheries from their current disastrous state to one where their inherent wealth is harnessed to benefit society over time.

What is at Stake: The Potential Global Payoff to WBFM

The potential global payoff to WBFM is very difficult to calculate. Although changing the role played by resource rent from driver of overexploitation to generator of wealth is the key issue, the rent generated is only part of the payoff. As Anderson (1980) showed, the social maximand in fisheries also includes consumer surplus and producer surplus. However, resource rent generation is of particular interest, especially for developing countries, because it will provide investable wealth.

Some authors have attempted to estimate potential global rents. Wilen (2005) suggests that annual global rents are on the order of $80 billion. Arnason (2007) estimates lost rents to be somewhat lower, on the order of $50 billion per annum. One reason for the difference between these estimates is that Wilen assumes, rightly in our view, that a focus on wealth will lead to the generation of new wealth. He gives the examples of the North Pacific halibut fishery and the Bering Sea pollock fishery. In both cases, switching to a wealth-based focus, through the introduction of property rights, led to major improvements in product mix and marketing practices leading to substantial increases in revenue. Such changes are difficult to predict but would probably be generalised. Wilen suggests

that such gains would be around 35% of revenues generated under previous management systems. It would clearly be of interest to undertake more work to verify this figure.

In practice, the difficulty is that rent estimates typically involve extrapolating the current industry and fishery structure into the future under the assumption that effective management arrangements are implemented. But the structure observed in this way is the one that has emerged from the current general state of mismanagement. Therefore, there are likely to be two stages in rent and wealth generation. The first stage will involve generating rents with the current structure, while the second will involve generating further rents as the structure evolves under the new conditions.

The Australian Southern Bluefin Tuna (SBT) fishery provides an interesting example of how difficult it may be to estimate second (and subsequent) round effects. Geen and Nayar (1988) modelled the likely impact of the introduction of Individual Transferable Quotas (ITQs) and concluded that potential resource rents were on the order of $6.5 million per annum. In practice, it turned out that this rent estimate was limited to stage one gains only. Understandably, the model failed to predict the wholesale change that took place in the fishery with the move towards tuna fattening for the sashimi market. As a result, it was estimated that for the 2002-2003 season the landed value of the wild harvest component of the fishery was approximately AUD 78 million, whilst the value-added from fattening out of wild-caught fish in sea cages was approximately AUD 150 million (Australian Fisheries Management Authority (AFMA) 2008)

The lesson, especially for developing countries, is that it is very difficult to predict the evolution of resource rents. In the Australian SBT case, estimates prior to ITQ introduction, based on current fishing practices, substantially underestimated future rents. Furthermore, in a developing country context where fiscal and legal institutions are immature, it may be appropriate for a government to maintain a stake in the fishery, whilst still providing fishers with the incentive to explore various development opportunities, including different types of fishing practices and markets. This often means a combination of use rights and fiscal arrangements. There are nonetheless complex political economy questions surrounding such a strategy that must be addressed when developing the institutions to implement such an approach.

The difficulty of estimating resource rents raises some other important policy issues. If rights are allocated on the basis of such estimates, the wealth distribution consequences may come as a surprise to policymakers. It is an interesting question as to where resource rents end and other (entrepreneurial) rents begin in the wealth creation process following the allocation of rights. Some countries, such as New Zealand and Iceland, have taken the view that it is best for government to allocate rights once and for all in order to provide maximum encouragement to the private sector to develop the wealth potential of the fish resource. Standard fiscal arrangements might then be considered mature enough to ensure that there is an equitable sharing of this wealth throughout the economy, although in Iceland at least the arrangements have been challenged. In developing countries, the choice may be complicated by the fact that both capital markets and fiscal (and/or legal) regimes may be inadequate to ensure either the full realisation of the potential resource value or its equitable distribution. It may be necessary, therefore, to address this issue directly perhaps by developing specific fiscal arrangements for fish resources, rather than relying on general texts, and perhaps also by restricting use rights in some way.

The tuna example also throws some light on the issue of different types of rent. The development of tuna fattening in the SBT fishery has been copied in the Mediterranean, but the results have been completely different. In Australia, tuna fattening is generating substantial wealth from the resource; in the Mediterranean, it is leading to overfishing to the extent that international NGOs are calling for the Atlantic bluefin tuna to be declared an endangered species. They are also calling for consumers to boycott such tuna (a call which has already resulted in numerous hyper- and supermarkets around the Mediterranean refusing to sell bluefin tuna until its management improves (*e.g.*, www.

naturalchoices.co.uk/WWF-call-on-retail-industry-to?id_mot=7). It seems clear, therefore, that while wealth *generated* by tuna fattening under the Australian SBT scenario depends on technical innovation, its *sustainability* depends on institutional arrangements in the fishery (in particular the move towards an ITQ-based fishery and measures to prevent other nations entering the fishery).

Finally, in assessing the payoff to WBFM, the fact must be recognised that the world is not starting from a position of zero rents. As discussed above, the position is currently negative due to the existence of substantial subsidies, even if it is difficult to know their precise value. It would appear that the total global payoff to WBFM could easily exceed 100 billion US dollars.

Whilst such estimates may be a useful way to draw attention to the resource rent issue in international policy circles and encourage movement towards improved management, the key question is how to create conditions for wealth generation that are sustainable both through and on the basis of these rents and to ensure that such wealth is used in a socially optimal manner. This is a political economy question and not one that can be answered by science.

WBFM and Management Instruments

Moving from the conventional model of fisheries exploitation and management towards a new wealth-based alternative involves two broad steps (note that it will be necessary to address these two steps together, not sequentially). The first step is to improve the management of the fishery so as to generate sustainable wealth from fish resources. The second step is to ensure an equitable distribution and use of this wealth. This second step is more contentious because it requires assumptions about what is considered equitable within a society and what is an appropriate use of wealth.

Development agencies generally stress that a key goal is to ensure that growth is pro-poor so as to enhance fisheries' contribution to poverty reduction, in which case generating sustainable fish wealth should contribute to growth in the economy at large.[2] This will increase opportunities for investments in those areas of the economy that are most likely to have a positive impact on the poor, such as primary education, health, and infrastructure.

However, before distributing the resource wealth, it is necessary to identify management instruments that are capable of ensuring that it is generated on a sustainable basis. The range of effective management instruments is rather limited at present, but the adoption of WBFM might help to widen the debate.

As mentioned earlier, an essential step is to define logical and meaningful fishery management units (FMUs). Many countries continue to classify fishing activity on a very wide basis, using terms such as industrial fisheries, small-scale fisheries, trawl fisheries, and so on; definitions that are generally insufficient for effective management. Fishing effort can easily switch from one activity or target species to another within the definition, and in practice no control is exercised over the activity.

For each FMU, decisions must be made as to the appropriate set of management instruments. One key feature of WBFM is that it necessarily relies heavily on market-based management instruments. Such instruments were recently reviewed by the OECD (2006) and include the familiar individual catch quotas (transferable and non-transferable), limited licences (transferable and non-transferable), individual effort quotas (transferable and non-transferable), territorial use rights, vessel catch limits, and community-based catch quotas.

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[2] The importance of economic growth for poverty reduction is well recognised by international development partners (*e.g.*, www.dfid.gov.uk/news/files/speeches/alexander-growth-fulltext.asp).

However, the review is rather limited in scope, equating market-based instruments with access rights. Such market instruments tend to only partially define ownership rights in fisheries. Wealth creation opportunities using them are often limited due to the high transaction costs and free rider problems that need to be overcome to act collectively within a common pool property system. This limits the incentives for investment in management.

The WBFM approach opens the door to the consideration of more flexible and complete ownership and management institutions built around corporate management principles and structures. The idea of having a corporate owner introduces more legal variety into the concept of property (a key rationale underpinning the establishment of firms *per se*) including a range of commercial and management advantages (flexibilities) in ownership—*e.g.*, management can proceed independently of stock holders, corporate management does not have to overcome transaction problems of multiple ownership, shares are transferable and have unlimited divisibility, and liabilities can be managed. Some existing systems have developed in this direction where clearer distinctions are being drawn between the ownership and control of property allocated in fisheries. For example, the policy framework of the New Zealand ITQ system is now modelled on a corporate framework; *i.e.*, 100 million transferable shares of productivity are issued in each particular fisheries management unit. What distinguishes this system from a pure corporate model is that individual shareholdings in productive capacity are allocated as private property directly (and special provisions are made to facilitate collective action amongst shareholders within the legal framework), whereas a pure corporate model would allow all ownership of the resource to be in the hands of one entity and it operates under normal commercial law.

Whilst this discussion illustrates one direction in which market-based measures may evolve, it is also useful to consider two other broad sets of instruments that might be construed as being market based. These are appropriately constructed fiscal arrangements and consumer-based interventions, such a certification practices.

Through fiscal arrangements, management authorities are able to exercise some control over fish prices and/or fishing costs, as perceived by fishers, thereby changing at source the economic incentives facing them. Such arrangements might include a variety of measures, most obviously resource rentals of some kind, and green (or rather blue) taxes. Their precise implementation will depend, *inter alia*, on local institutional arrangements and the nature of the fishery. To date, the effectiveness of such measures has largely been demonstrated negatively, through fuel subsidies and the misapplication of resource rent taxes, for instance. However, if appropriate institutions can be designed, fiscal measures, including bespoke resource rentals, may be an effective measure to address, at least in part, the wealth issue. In developing countries, they may be a crucial element for reasons already alluded to (*e.g.*, weakness of the general fiscal system, tendency for wealth to migrate offshore).

Second, various organisations are placing increasing pressure on the fish market through the consumer with the explicit aim of changing exploitation practices. At present, it is regrettable that many certification practices build from traditional measures of fisheries success, such as MSY, and have the potential to mislead the development process the same way as have past government-led approaches. It would seem useful, therefore, to work with such schemes to develop "WBFM labels." Appropriately designed, a WBFM certification process could prove to be an effective way of encouraging good governance that goes beyond resource sustainability to include in particular issues of equitable resource wealth distribution and utilisation.

Successful WBFM requires the design and implementation of an appropriate set of management instruments for each FMU. The key issue is to consider how each of these measures will affect the ability of the fishery in question to generate resource rents on a sustainable basis.

Scope of WBFM

Many of the examples of well-managed fisheries, including those discussed above, tend to be from single-species, temperate-water fisheries, often in developed countries, which are underpinned by quota management systems. This observation leads to the question as to whether WBFM is universal in scope or whether it is restricted to certain kinds of fisheries only. It is important first to reemphasise that a wealth-based approach does not begin with a particular institutional outcome in mind. It is nonetheless also important to guard against dismissing current successful practices too lightly.

In our view, most of the examples come from these fisheries for the simple reason that this is where such systems have been experimented. It is not that such systems have been a disaster in multi-species fisheries or tropical waters, it is simply that by and large they have never been tried in such cases. Technological and institutional limitations, once seen as a barrier to the use of such systems in complex fisheries, are now largely resolved. Modern computing capacity means that managing the various transactions involved is no longer a challenge. And as quota systems have evolved they have become less and less distinguishable from community-based or corporate arrangements, an outcome that has long been predicted by Scott (1988) and others.

The New Zealand quota management system, for example, now encompasses 97 species groupings which are divided into 629 individual management units and 62.9 billion quota shares. Each year these shareholdings generate around 566,000 tonnes of Annual Catch Entitlements (ACE) which are balanced monthly and annually against catch taken by fishers in single-stock fisheries (such as lobster) and across complex mixed-catch fisheries. Institutional innovations, such as the introduction of cost recovery, the separation of ownership interests in productivity (quota shares) from catch balancing rights, the introduction of retrospective catch balancing arrangements, and the use of tax incentives (deemed values) to encourage the balancing of catch across mixed species fisheries, have led to the development of collective decision-making structures around communities of interest (*i.e.*, quota ownership) which mirror what might be expected in community or territorial use rights fisheries (TURFs)-based management regimes.

We argue that WBFM is a universal approach for the simple reason that it has been developed from an analysis of the common cause of fisheries overexploitation. This, however, certainly does not mean that WBFM proposes a common solution; the causes of the problem may be the same everywhere, but the solutions have to take account of all kinds of local circumstances, including the nature of the fish resource, the type of exploitation system, the political system, the coastal geography, the kind of markets in which the fish are sold, and a host of other considerations. The search must, therefore, be for local solutions but based on the principles of WBFM.

As an example, consider the case of small-scale fisheries (SSF). Such fisheries attract much interest and many people feel that for various reasons SSF deserve to be, and should be, protected.

One reason for this interest is that SSF are often taken to be synonymous with various degrees of hardship, deprivation, and poverty. Using fish resources to achieve poverty reduction seems to require favouring SSF in some way. Before continuing the discussion, it should be noted that if fish resources have a role to play in poverty reduction, it is precisely because they are valuable.

Another reason is that the problem to be resolved tends to be seen as "poverty within SSF and in communities that depend on fishing." This view may be particularly strong where free and open access to the resource is seen as providing a social safety net. In such cases, very bleak pictures may be painted of the condition of SSF. For example, the FAO argued that "… in the context of generally poor communities, it is impossible to exclude people living on the edge of survival from fishing without creating alternative sources of food and livelihoods. Exhortations about reducing pressure on fisheries resources are fu-

tile as hungry people will choose, quite reasonably, to survive in the short-run rather than to preserve or rebuild a resource that they might not otherwise survive to benefit from" (UNFAO 2005, p. xiv). Although this statement cannot be attacked on its own terms, one has to wonder what proportion of SSF it is really describing. In fact, the FAO acknowledges that there is often very little precise information about the real contribution of small-scale fisheries to livelihoods and economies in developing countries (UNFAO 2005, p. 2).

An important issue that must be addressed is that in practice the definition of SSF changes through time and over space. Any adopted definition is arbitrary, based essentially on a typology of production technology at a particular moment and in a particular place. As a result, it may become very difficult from a policy viewpoint to know exactly who or what is being favoured. Great care must be taken to ensure that SSF is an effective policy entry point, particularly given the fact that from a fisheries management point of view SSF almost never constitute a logical fishery management unit.

Faced with these difficulties and considerations, WBFM begins from a different direction, noting that poverty is a multifaceted issue, which no single economic sector can be expected to deal with alone. The question of poverty reduction raises a series of policy questions, such as the roles of the public and private sectors in fishing and the nature of the contribution that fishing can make to macroeconomic objectives. Unless the fishery sector is very large relative to the rest of the economy (an exceptional case), it is difficult to believe that sustainable poverty alleviation can be achieved at the level of sectors such as fisheries. It is a macroeconomic issue to which the fisheries sector can at most contribute as a creator of wealth.

Starting from this position, WBFM sees SSF as one group of exploiters of fish resources that must be integrated into fishery management plans in the same way as any other user. One important reason for this is to protect SSF because, other than in the case of sedentary species, the scale of the resource that they exploit is almost always geographically more extensive than the scale of their fishing activity. As a result the resource comes into contact with other users in other parts of its range, and it is impossible for SSF to retain the benefits of good management. The only way this can be done is to take a more holistic view of the management problem.

A related issue is that in many cases (but not always) SSF have a comparative advantage over other types of fishing (*e.g.*, because of low labour and/or fuel costs or the use of more selective gear types). However, it is often difficult, if not impossible, for this advantage to find expression because there is no mechanism for the sustainable transfer of fishing possibilities from one type of fishing to another. Instead, SSF finds itself involved in the classic race for fish both internally and with other segments targeting the same resources.

The challenge highlighted by WBFM is to design fishery management instruments that enable SSF to be managed within a holistic framework. This viewpoint finds an echo in a paper by Gonzales (2008) who argues that, "small boats can cause as much damage in fisheries around the world as big trawlers." She argues that "small" does not mean "weak"(small-scale fisheries can enjoy significant comparative advantage precisely because they can be economically more efficient than industrial fisheries), "local" (in international competition both for catches and for markets, small-scale fleets are a significant and growing global force), "sustainable" (small-scale fisheries are not immune to overcapacity, overfishing, or destructive fishing practices), or even "small" (one recent rough estimate concludes that small-scale fisheries likely account for between 25% and 33% of worldwide capture fisheries production). As a result she concludes that, "relaxing World Trade Organisation (WTO) rules for 'small-scale' fisheries, especially when these are defined purely by vessel size, runs a very great risk of introducing a crippling loophole into WTO fisheries subsidies rules" (Gonzales 2008, p. 6). Adopting a WBFM-approach would provide a framework to address many of the points made by Gonzales.

Making the Transition to WBFM

Moving towards WBFM will inevitably be a gradual process. Much effort will have to be expended with policymakers and other key actors to overcome resistance to change and vested interest. Worldwide experience suggests that the movement towards effective management systems does not happen by chance, but because of pressure for change within the system (although it may also come from outside in the case where fisheries come under pressure from other activities, such as offshore oil exploration or coastal tourism). Generating this pressure for change is not simple. There will be counter-pressure to maintain the status quo from those who have made investment or livelihood choices based on this status quo and who seek to maintain it. There is a need, therefore, to proceed gradually, exploring the implications of change for different groups and individuals, building consensus around the new approach.

The principle of WBFM should be formally recognised within national fisheries policy. Such policy should reflect a consensus by society on what it wishes to achieve through the exploitation (or not) of its fish resources and how it is going to achieve those objectives. In this regard, 'visioning' of the future of the fishery will be crucial in ensuring the stakeholders' role in driving the process of change.

The New Zealand experience, for example, together with those from other countries, shows that the move towards wealth-based models can be a lengthy process, measured in decades rather than years. The process may take even longer in countries with larger and more diverse fishing populations. Sounding a more optimistic note, however, evidence of best practice from such successful fisheries will undoubtedly facilitate the process for those starting on the path to WBFM.

In making a start, we should recognise that past policy failure has led to too many people and vessels depending directly on too few fish. Finding alternative livelihoods for those displaced by the inevitability of some capacity reduction will be an important social challenge. However, this difficulty should not be overstated. No government is likely to reform all of its fisheries at the same time. In fact, best practice suggests that progressive policy development is achieved by managing the economically more important fisheries first, with successful systems gradually being introduced and extended to others. Moreover, improved management will generate wealth that can contribute to investments in the wider economy in general and into alternative livelihood opportunities in particular.

In any event, the pace of policy development is also likely to be slow, because in developing countries at least, ministries often have few staff devoted to fisheries management. Human (and institutional) capacity is likely to be limited to an initial process to develop one or two plans for key fisheries, with a very gradual extension to other FMUs as experience is gained.

Over recent years much international support has been given to high-level initiatives aimed at improving fisheries governance; for instance, the FAO Code of Conduct for Responsible Fisheries (CCRF)[3] and the World Summit for Sustainable Development (WSSD).[4]

We suggest that what seems most urgent now is practical assistance to help countries to implement plans based around the wealth generation concept. The need for human and institutional capacity-building support will vary, but the most important requirements are likely to be found in:

- Research: fisheries research continues to be dominated by biophysical issues, especially backward-looking stock assessment. There is a need to move towards predictive models. There is also a need to develop social science research, including economics, political economy, bio-economic modelling.

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[3] See www.fao.org/fishery/ccrf

[4] See www.un.org/esa/sustdev/document/WSSD_POI_PD/English/POIToc.htm

- Policy development and administration: despite the central importance of fisheries management, many fisheries ministries have few staff trained and experienced in this area; particularly in alternative management options that exist.

- Industry organisation and capacity: the fishing industry will benefit substantially from organisational development and capacity building if it is to play an effective role in helping determine policy and management arrangements.

As emphasised above, WBFM is an approach that must be adapted to national and fishery-specific objectives and conditions and one which calls for appropriate management instruments to be developed. New institutions and organisations will be needed; in particular, frameworks of rights and fiscal arrangements. In practice, the types of institutions ultimately adopted will depend not on economic theory but on an empirical understanding of the political and economic factors in the country or region that applies a WBFM approach.[5]

The fisheries legal framework must support the implementation of the strategy. It is essential to establish strategic direction before developing or reforming legal instruments. Close attention should be paid to the nature of the legal instruments that are developed. The strategy, and its implementation, must be expected to be dynamic, and care needs to be taken to avoid using legal instruments that are rigid and difficult to change. The best generic approach seems to be one that has a broad fisheries law that establishes general goals and directions for the fisheries sector based on policy and strategy documents and then develops a "cascading" structure of legal instruments to implement the law.

The move towards WBFM will require capacity that is usually not in great supply. There is almost always a need for a capacity-building exercise involving human capacity (training and the recruitment of new skills) and institutional capacity (for example, the development of systems to manage fishing rights on a day-to-day basis).

Another difficulty in many countries is that the fishing sector is poorly integrated into macroeconomic goals. As discussed above, a key requirement is to work with policymakers to broaden understanding of the potential macroeconomic contribution that the sector is capable of making. It will then be possible to address key questions, such as how the sector can best contribute to important national policy goals (*e.g.*, poverty reduction and equity) and who will benefit from improvements in the sector.

Although there is no doubt that WBFM offers the prospect of a substantial increase in net social and economic welfare (especially starting from the current parlous state of world fisheries), regrettably it does not guarantee that everyone will gain, or that the distribution of the gains will be straightforward through time. All we can say with certainty is that the gains of the gainers will eventually be greater than the losses of the losers.

There are two issues. First, in the short term investment will be required in both the fish stock and the institutional arrangements for its management. Depending on the nature of the fish stock, the payoff to this investment will take more or less time to come through. Second, once the payoff does come through, attention will have to be paid to the distribution of the gains and the losses, both for reasons of equity and sustainability. Under certain conditions, all the gains could accrue to one person or enterprise, regardless of their extent. This extreme outcome would be judged unfair in many countries and unlikely to persist. Some work will be needed to consider who gains and who loses and to devise appropriate social policies. (To keep things in perspective, it should be noted that this kind of problem is definitely not unique to fishing but affects almost all decisions in modern societies and economies. For example, interest rate changes affect borrowers and savers inversely, but this difficulty does not paralyse monetary policy.)

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[5] These factors are examined in a series of policy briefs available at Onefish (www.onefish.org/id/213564?language=en).

Conclusions and Recommendations

Globally, fish resources are in a poor and apparently declining (certainly non-improving) situation, notwithstanding the fact that the vast majority of the world's fisheries have long been managed. This article argues that this situation arises from widespread ignorance in policy circles of the crucial role played by resource rents.

"Typical" fisheries policy is characterised by discord with a focus largely on the symptoms of overexploitation resulting from the failure to deal with resource rent. Both overfishing and overcapacity, the prime targets of management, are manifestations of the underlying problem facing fisheries management, and it is hardly surprising that management measures focussing on these problems alone have failed.

In fact, it has long been abundantly clear from both theory and empirical experience that limiting catch and capacity (or access) are not sufficient to conserve the wealth base, let alone generate increasing sustainable wealth. The issue is how to draw on this theory and experience in order to improve fisheries policy in practice.

This article concludes that focussing fisheries policy explicitly on the wealth of the resource is the only way to reverse the decline in fish resources and to ensure that the potential social and economic benefits from their exploitation are fully realised. Such a change in focus is especially urgent in developing countries, where the need to optimise sustainable benefits from scarce fish resources is the greatest.

Once the goal of wealth generation is recognised as the lynch pin of fisheries policy, attention can be turned to how to achieve it. An important element will be to develop understanding among key stakeholders, in particular other government departments and the resource users, of the potential wealth that can be generated from fish resources. In this way, an appropriate set of success indicators can be developed for the exploitation of these resources. In setting out to meet these indicators, it is important to be flexible about institutional arrangements and management tools, as both are likely to have to differ both between countries and within countries for different fisheries.

Notwithstanding the need to allow for such differences, it seems clear that use rights will have to play a fundamental role in finding solutions. The difficulty, however, is identifying the best formulation of use rights, as these may be expressed in a myriad of ways (*e.g.*, catch or spatially based; individually, corporately, or communally held; for longer or shorter durations; and so on). Although there is no unique solution to this problem, our contention is that WBFM offers a unique approach to finding a solution.

Appropriately designed use rights can be expected to lead to sustainable wealth generation from the fish resource. However, attention must also be paid to the distribution of this wealth between stakeholders. In some cases, it may be best to devolve it to the level of the individual fishers. This seems most likely to be the case in developed countries where fish resource exploitation is unable to generate a substantial contribution to national wealth, although even here it might be noted that the generation (and capitalisation) of fish resource wealth may be a major issue at more local levels.

In the case of developing countries, especially those where natural resources, such as fish, still represent an important potential contribution to sustainable national wealth and growth, distributive issues may be crucial to the long-term success of a management system. In these cases, it will be very important to consider carefully the fiscal stance. Moreover, fiscal tools may be a means not only of ensuring a fair sharing of resource rents, but they may also represent a useful additional tool to prevent overexploitation.

To be successful, an appropriate combination of use rights and fiscal measures must be implemented. Once this is recognised, the need emerges in most countries (particularly in developing countries), for reform of the legal and institutional framework and support to build the necessary human and institutional capacity to implement the new vision. Such reform and support may represent a very demanding challenge because the mis-

placed focus of fisheries policy over a very long period often results in an inappropriate institutional framework which may generate substantial hostility to change.

Adopting WBFM and the associated reforms offers the best hope of reversing the current situation, particularly in developing countries, where, broadly speaking, poor fishers contribute to their own poverty by destroying the fish resource and the wealth on which they depend. In fisheries policy, the benefits of fish resource exploitation have tended to be perceived entirely in terms of food (catch), jobs, incomes, and a range of other activity-related benefits. The key benefit that rationally exploited fish resources are capable of providing renewable wealth that can contribute to economic growth has been overlooked. Yet as argued in World Bank (2005): "Without the creation of a surplus for investment there is no way for countries to escape low-level subsistence equilibrium." And what is true of countries is probably even more so for regions and individuals dependent on fish resources.

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